

AMENDMENTS TO THE CLAIMS

Please amend claims 1-15 and cancel claim 16 as follows:

1. (currently amended) A Mach-Zehnder interferometer modulator for modulating a beam of laser light, the modulator ~~including~~ comprising a pair of separate waveguides through which the laser light is passed after splitting in a splitting zone and after which the light is recombined in a merge zone, the waveguides being formed of a material having electro-optic properties and there being provided opposed pairs of electrodes electrically located so as to be able to effect optical changes within the material of the waveguides, ~~characterised in that wherein~~ the waveguides are formed in a semiconductor in a semiconductor material with one of the electrodes of each pair being formed in a doped layer, said doped layer being of relatively high conductivity compared to the semiconductor material, buried within or below the waveguide material whilst the other electrode, ~~the a top electrode~~, is a surface metalisation, the doped layer being trenched so that adjacent electrodes in the doped layer are electrically isolated from one another so that one of the electrodes in the doped layer can be connected with a different electrical polarity to the other electrode in the doped layer thereby permitting the connection of the pairs of electrodes in parallel anti-phase mode.
2. (currently amended) ~~A~~ The modulator as claimed in claim 1, further ~~characterised in that there is~~ comprising a coplanar stripline transmission-line for an RF signal comprising a pair of metal rails arranged on either side of the ~~Mach-Zehnder Interferometer pair of waveguide-air~~ waveguides, each rail effecting direct contact to the buried electrode of the adjacent waveguide while also effecting contact to the top electrode of the remote waveguide by means of metal linkages passing through or over the adjacent waveguide.
3. (currently amended) A modulator as claimed in claim 1, further ~~characterised in that there is~~ comprising a coplanar waveguide transmission-line for an RF signal ~~comprising~~ having three rails, a central rail at one potential and located between the waveguides, and two outer rails at the same, second, potential which differs from the first potential, with each waveguide of the ~~Mach-Zehnder Interferometer pair of waveguide-pair~~ waveguides running

in one of the two inter-rail gaps, the central rail effecting direct contact to the buried electrode of the first waveguide and contacting the top electrode of the second waveguide by means of metal linkages, the top electrode of the first waveguide being contacted by means of metal linkages from the first outer rail, and the second outer rail being in direct contact to the buried electrode of the second waveguide.

4. (currently amended) ~~A-The modulator as claimed in claim 3, in which~~wherein the doped layer extends beneath the first outer rail, and there is provided a trench through the doped layer so as to isolate the region of the doped layer beneath the first waveguide from that beneath the first outer rail.

5. (currently amended) ~~A-The modulator as claimed in claim 1, further characterised in that there is comprising~~ a coplanar stripline transmission-line for an RF signal ~~comprising having~~ a pair of metal rails arranged on either side of the ~~Mach-Zehnder Interferometer pair of waveguides~~ waveguide pair, each rail having a width sufficient to enable capacitive connection to the buried electrode over which it is located and effecting thereby high frequency contact to the buried electrode of the adjacent waveguide while also effecting contact to the top electrode of the remote waveguide by means of metal linkages passing through or over the adjacent waveguide.

6. (currently amended) ~~A-The modulator as claimed in claim 1, further characterised in that there is comprising~~ a coplanar waveguide transmission-line for an RF signal comprising three rails, a central rail at one potential and located between the waveguides, and two outer rails at the same, second, potential, with each waveguide of the ~~Mach-Zehnder Interferometer waveguide pair~~ pair of waveguides running on one of the two inter-rail gaps, the central rail and one of the outer rails being of sufficient width to enable those rails to make capacitance contact with their opposed buried electrodes, the central rail effecting capacitive contact to the buried electrode of the first waveguide and contacting the top electrode of the second waveguide by means of metal linkages, the top electrode of the first waveguide being contacted by means of metal linkages from first outer rail, and the second outer rail being in capacitive contact to the buried electrode of the second waveguide, the capacitive contacts being effective electrical contacts for high frequency alternating signals.

7. (currently amended) ~~A-The modulator as claimed in claim 6, in which wherein~~ the doped layer extends beneath the first outer rail, and there is provided a trench through the doped layer so as to isolate the region of the doped layer beneath the first waveguide from that beneath the first outer rail.
8. (currently amended) ~~A-The modulator as claimed in any one of the preceding claims in which there is provided claim 1, further comprising~~ a passive waveguide region trenched as in the active regions between the active regions and the merge zone.
9. (currently amended) ~~A-The modulator as claimed in claim 1, further comprising any one of the preceding claims in which there is provided~~ a passive waveguide region trenched as in the active regions between the active regions and the splitter zone.
10. (currently amended) ~~A-The modulator as claimed in claim 1, wherein the any one of the preceding claims in which~~ conductivity in the doped area is locally removed in the region of the merge zone.
11. (currently amended) ~~A-The modulator as claimed in claim 1, wherein the any one of the preceding claims in which~~ conductivity in that doped area is locally removed in the region of the splitter zone.
12. (currently amended) ~~A-The modulator as claimed in claim 1, wherein any one of the preceding claims in which~~ the semiconductor material is based on GaAs, and the waveguides are formed in GaAs bounded by layers of AlGaAs.
13. (currently amended) ~~A-The modulator as claimed in claim 1, wherein any one of claims 1 to 12 in which~~ the semiconductor material is selected from the group InGaAsP, or GaInAsP or GaAlInP and the bounding layer is InP.

14. (currently amended) ~~A-The modulator as claimed in claim 1 wherein any one of the~~
~~preceding claims in which~~ the electrode formed by surface metalisation is a Schottky
rectifying contact.

15. (currently amended) ~~A-The modulator as claimed in claim 1, wherein any one of~~
~~claims 1 to 13 in which~~ the electrode formed by surface metalisation is an ohmic contact to a
p-doped under layer.

16. canceled